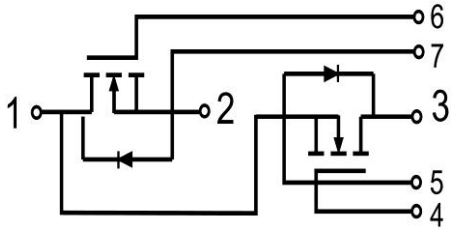
GSM300M12BM2

SiC MOSFET Half-Bridge Module

V_{DS}	1200V
$R_{DS(ON)\ (Typ.)}$	5mΩ
I_{DS}	300A

Features：

- Reduced Losses for Higher System Efficiency
- High Frequency Switching
- Low Capacitances and Low Gate Charge
- Fast and Reliable Body Diode
- High Avalanche and Short Circuit Ruggedness
- Low Conduction Losses at High Temperatures
- Minimized Gate Ringing
- Improved Thermal Capability
- Ease of Paralleing without Thermal Runaway
- Simple to Drive
- Copper Baseplate and Aluminum Nitride Insulator



Applications：

- Solar Inverters
- Motor Drives
- EV Charging
- High Voltage DC-DC Converters
- SMPS、UPS
- Smart Grid Transmission and Distribution
- Induction Heating and Welding

SiC MOSFET

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

Absolute Maximum Ratings (T_C=25℃unless otherwise specified)

Symbol	Description		Values	Units
V_{DSS}	Drain-Source Blocking Voltage		1200	V
V_{GSmax}	Gate-Source Voltage	Absolute Maximum Values	-10/+20	V
V_{GSop}		Recommended Operational Values	-5/+15	V
I_D	Continuous Drain Current	V_{GS}=-5/+15V, T_C=25℃	452	A
		V_{GS}=-5/+15V, T_C=100℃	320	A
		V_{GS}=-5/+15V, T_C=135℃	232	A
$I_{D(pluse)}$	Pulsed Drain Current	t_p≤3μs, D≤1%, V_{GS}=15V, T_C=25℃	1200	A
E_{AS}	Non-Repetitive Avalanche Energy	L=1.7mH, I_{AS}=58A	2850	mJ
P_D	Power Dissipation	T_C=25℃,T_J=175℃	1725	W

Electrical Characteristics of MOSFET (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions	Min.	Typ.	Max.	Units
$V_{(BR)DSS}$	Drain - Source Breakdown Voltage	V_{GS}=0V,I_D=400μA	1200			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=140mA, T_J=25℃		2.30		V
		V_{DS}=V_{GS}, I_D=140mA, T_J=125℃		1.60		V
		V_{DS}=V_{GS}, I_D=140mA, T_J=150℃		1.55		V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=1200V, V_{GS}=0V, T_J=25℃			1	mA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=20V, V_{DS}=0V			400	nA
		V_{GS}=-10V, V_{DS}=0V			-400	nA
$R_{DS(on)}$	On State Resistance	V_{GS}=15V, I_{DS}=300A, T_J=25˚C		5.0		mΩ
		V_{GS}=15V, I_{DS}=300A, T_J=125˚C		6.0		
		V_{GS}=15V, I_{DS}=300A, T_J=150˚C		6.5		
g_{fs}	Transconductance	V_{DS}=10V, I_D=240A		116.8		S
		V_{DS}=10V, I_D=240A, T_J=175˚C		131.6		
C_{iss}	Input Capacitance	V_{DS}=800V, f=1MHz, V_{GS} =0V, V_{AC}=25mV		23.2		nF

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

C_{oss}	Output Capacitance	V_{DS}=800V, f=1MHz, V_{GS} =0V, V_{AC}=25mV			0.70		nF
C_{rss}	Reverse Transfer Capacitance				0.06		nF
E_{oss}	C_{oss} Stored Energy	V_{DS}=800V, f=1MHz, V_{GS} =0V, V_{AC}=25mV			272		μJ
Q_{oss}	C_{oss} Stored Charge				1024		nC
Q_G	Total Gate Charge	V_{DS}=800V, V_{GS}=-5V to +15V, I_D=240A			720		nC
Q_{GS}	Gate-Source Charge				200		
Q_{GD}	Gate-Drain Charge				280		
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=600V, V_{GS}=-5V to +15V, I_D=300A, R_G(ext)=4.7Ω	T_J = 25℃		237		ns
			T_J = 125℃		190		
			T_J = 150℃		191		
t_r	Rise Time		T_J = 25℃		158		ns
			T_J = 125℃		122		
			T_J = 150℃		118		
$t_{d(off)}$	Turn-off Delay Time		T_J = 25℃		391		ns
			T_J = 125℃		373		
			T_J = 150℃		384		
t_f	Fall Time		T_J = 25℃		141		ns
			T_J = 125℃		152		
			T_J = 150℃		152		
E_{on}	Turn-on Switching Energy		T_J = 25℃		12.6		mJ
			T_J = 125℃		7.80		
			T_J = 150℃		7.30		
E_{off}	Turn-off Switching Energy		T_J = 25℃		23.8		mJ
			T_J = 125℃		19.7		
			T_J = 150℃		19.9		
$R_{G(int)-C}$	Internal Gate Resistance(chip)				0.3		Ω
$R_{G(int)-M}$	Internal Gate Resistance(module)				2.5		Ω
$R_{θJC}$	Thermal Resistance Junction-to-Case for SiC FET(per leg)					0.087	℃/W

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

Built-in SiC Body Diode

Electrical Characteristics of Diode (T_C=25℃ unless otherwise specified)

Symbol	Description	Conditions		Min.	Typ.	Max.	Units
I_S	Inverse Diode Continuous, Forward Current	V_{GS}=-5V, T_C=100℃		188			A
$I_{S(pluse)}$	Inverse Diode Direct Current, Pulsed	V_{GS}=-5V			752		A
V_{SD}	Diode Forward Voltage	I_{SD}=120A, V_{GS}=-5V, T_J=25℃			4.2		V
		I_{SD}=120A, V_{GS}=-5V, T_J=125℃			3.7		V
		I_{SD}=120A, V_{GS}=-5V, T_J=150℃			3.6		V
t_{rr}	Reverse Recovery Time	I_{SD}=300A,V_{GS}=-5V, V_R=600V, -di/dt=2805A/μs (T_J = 150℃)	T_J = 25℃		81		ns
			T_J = 125℃		95		
			T_J = 150℃		100		
Q_{rr}	Reverse Recovery Charge		T_J = 25℃		2.34		uC
			T_J = 125℃		4.80		
			T_J = 150℃		5.60		
I_{rr}	Peak Reverse Recovery Current		T_J = 25℃		42.2		A
			T_J = 125℃		80.0		
			T_J = 150℃		94.0		

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

Module

Symbol	Description		Min.	Typ.	Max.	Units
V_{ISO}	Isolation Voltage (All Terminals Shorted)	f = 50Hz, 1minute	4000			V
Internal Isolation			AlN Ceramic			
d_{creep}	Creepage Distance: Terminal to Baseplate				40	mm
	Creepage Distance: Terminal to Terminal				30	
d_{clear}	Terminal to Terminal				9	mm
L_{SCE}	Stray Inductance Module	Measured between terminals 2 and 3			15	nH
T_J	Maximum Junction Temperature				175	℃
T_{JOP}	Maximum Operating Junction Temperature Range		-40		+150	℃
T_{stg}	Storage Temperature		-40		+125	℃
CTI	Comparative Tracking Index		200			
$R_{\theta CS}$	Case-to-Sink Thermally (Conductive Grease Applied)				0.03	℃/W
M	Power Terminals Screw:M6		3.0		5.0	N·m
M	Mounting Screw:M6		4.0		6.0	N·m
G	Weight			290		g

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

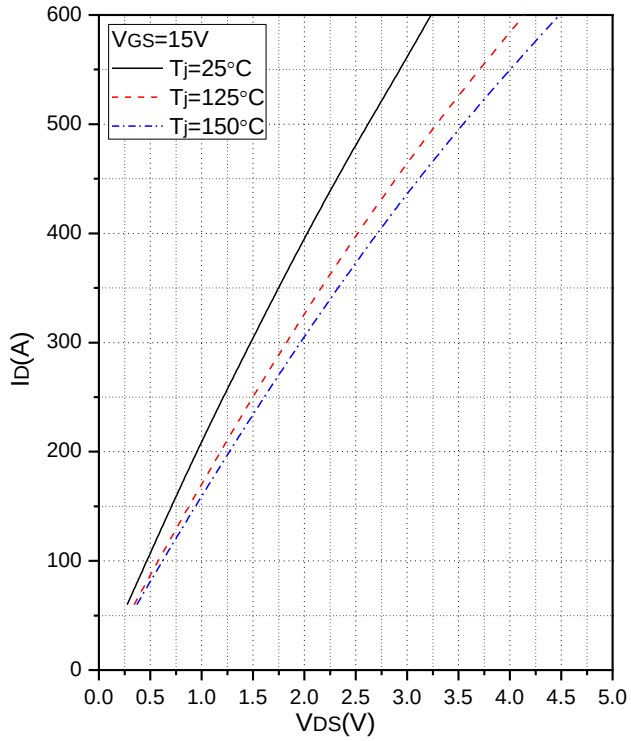


Fig.1 Transfer Characteristics

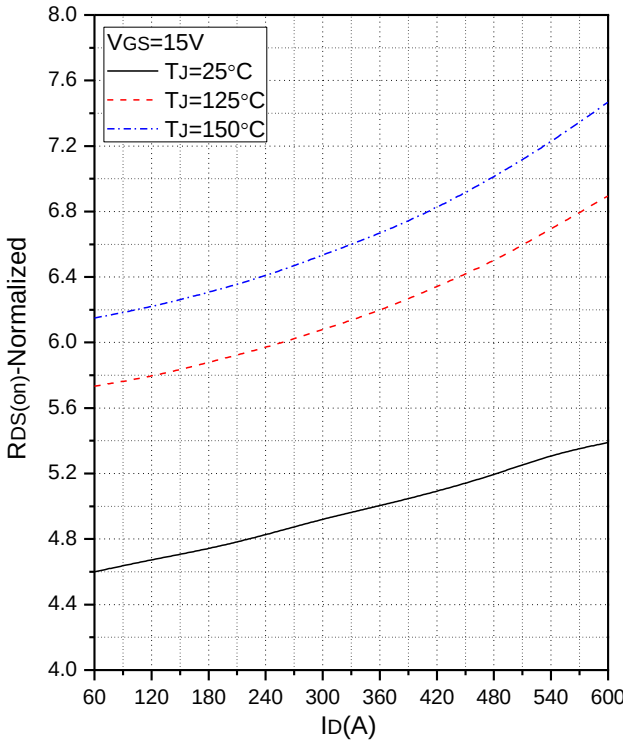


Fig.2 Normalized On-Resistance vs. Drain Current

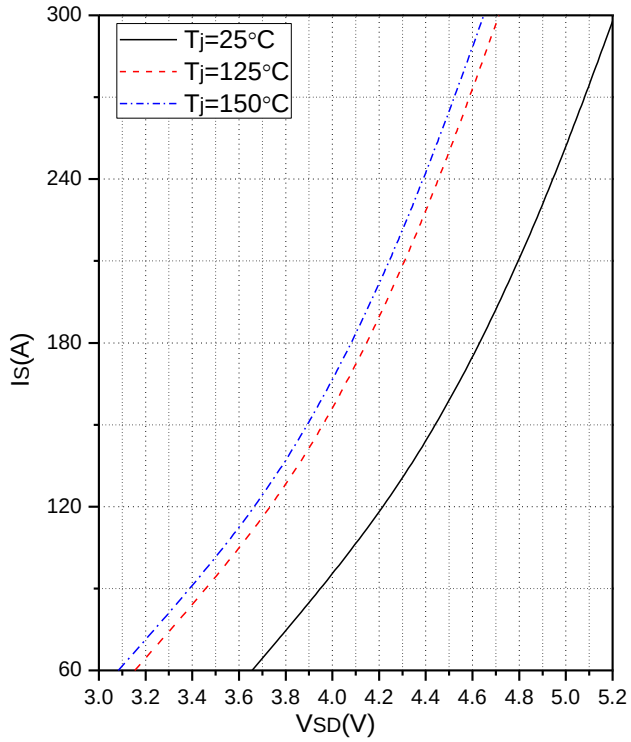


Fig.3 Forward Characteristics

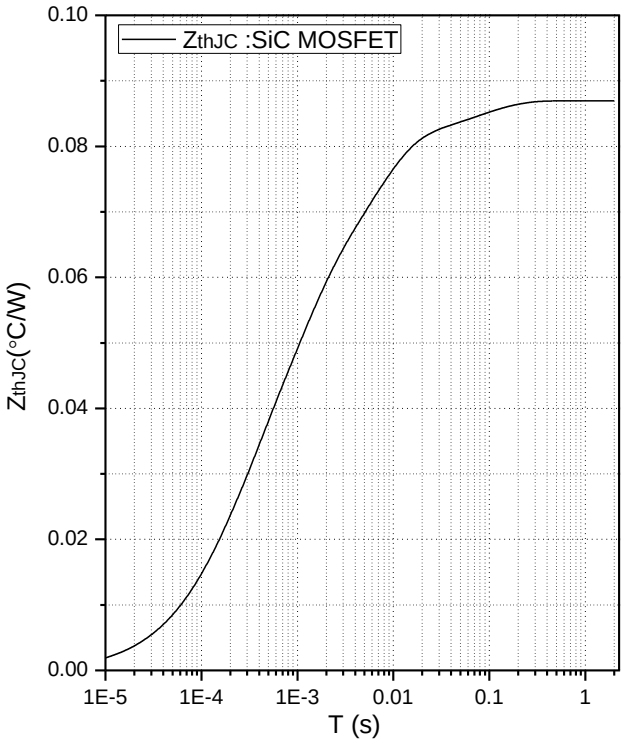


Fig.4 Transient Thermal Impedance

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

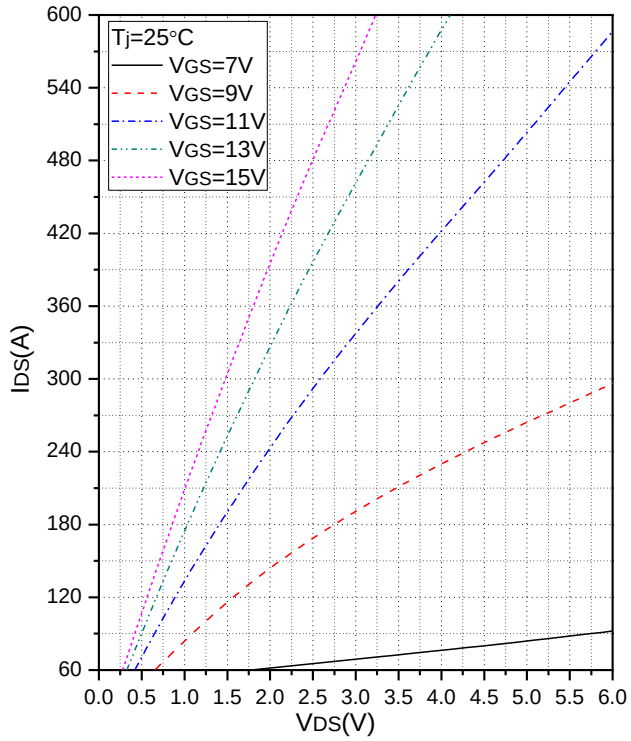


Fig.5 Typical Output Characteristics

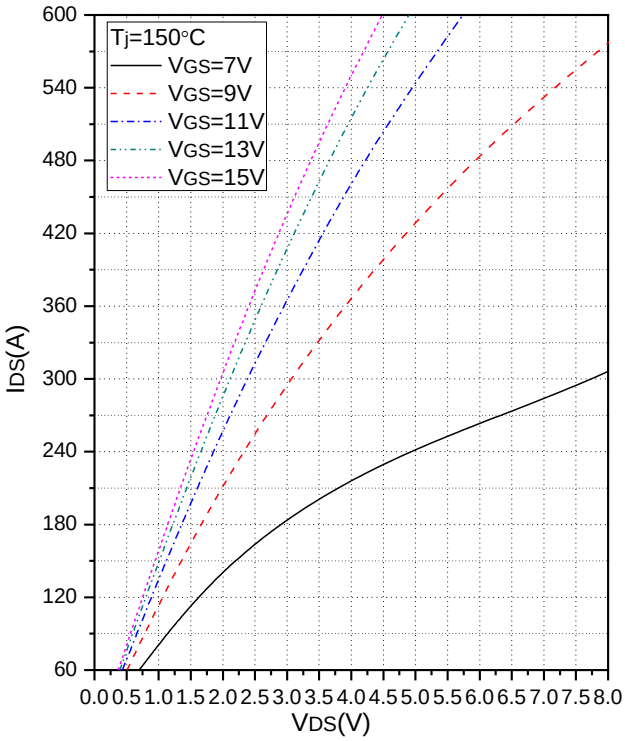


Fig.6 Typical Output Characteristics

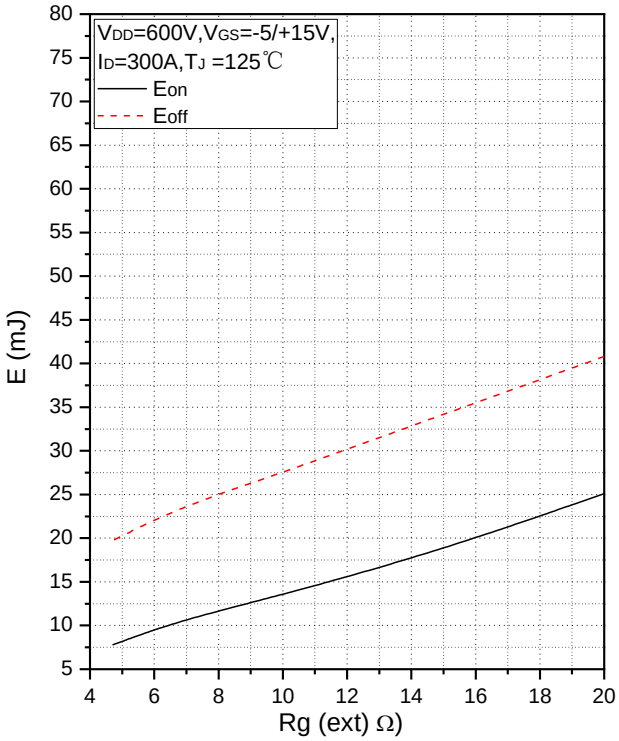


Fig.7 Inductive Switching Energy vs. R_G(ext)

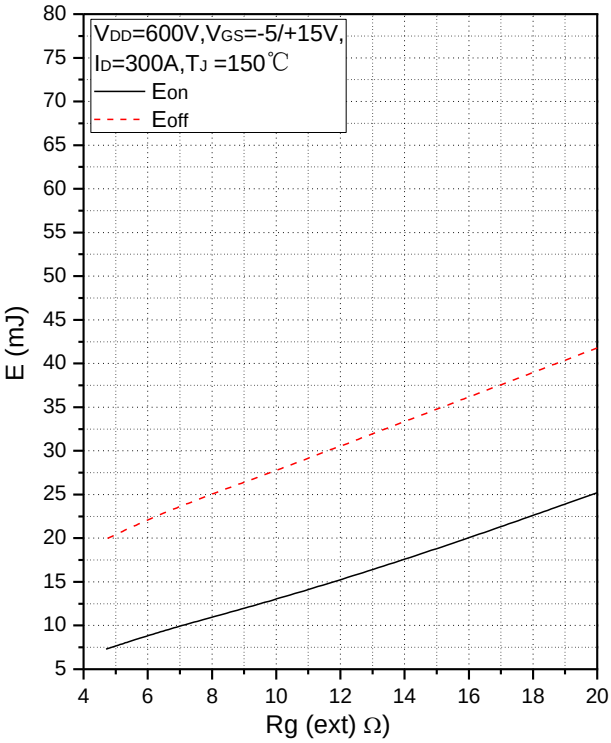
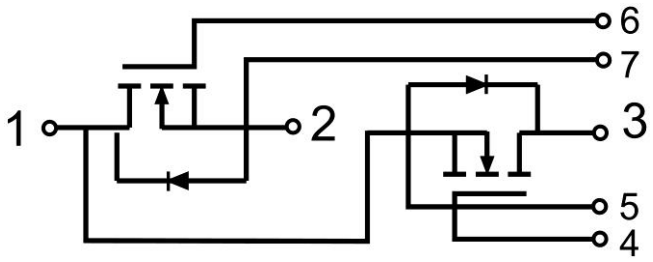


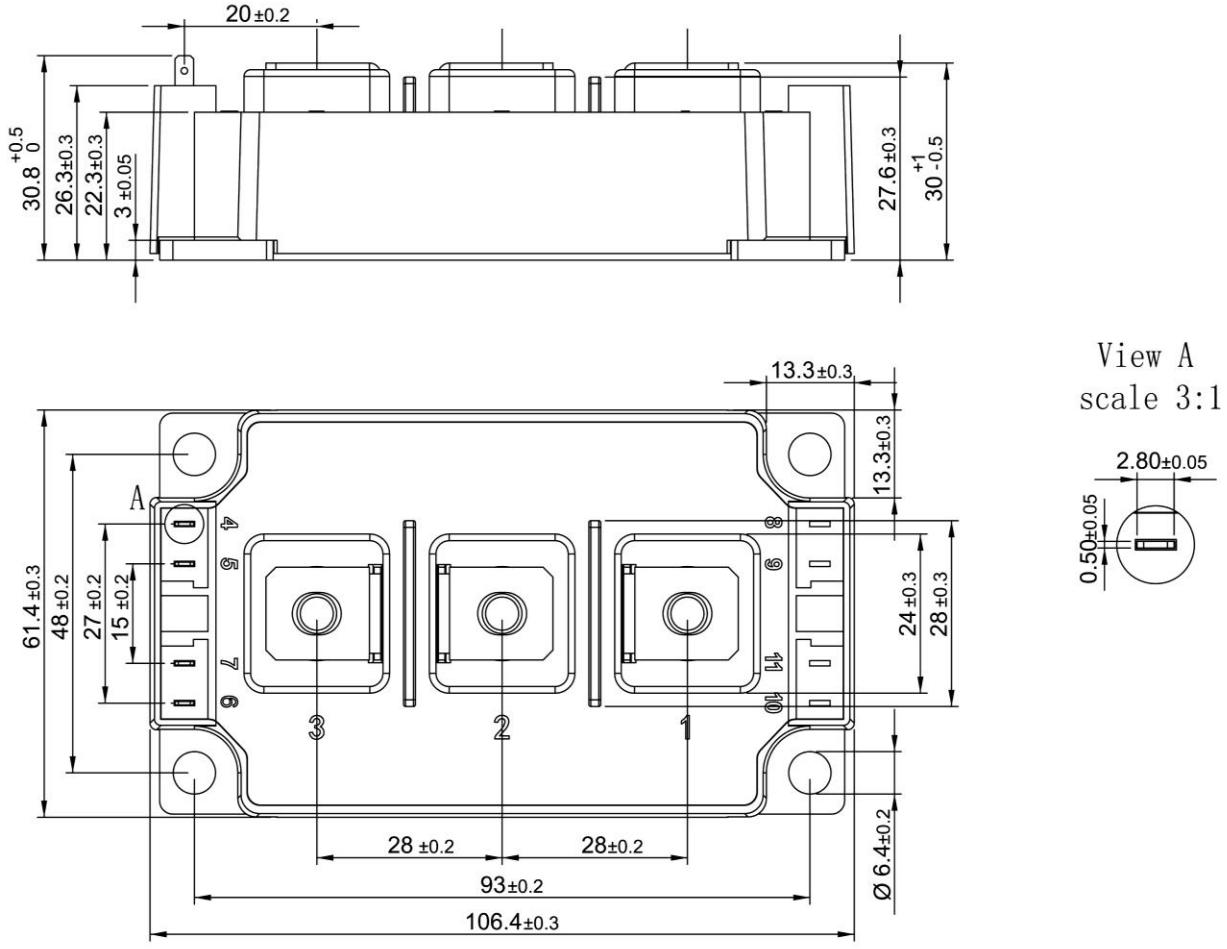
Fig.8 Inductive Switching Energy vs. R_G(ext)

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

Internal Circuit



Package Outline (Unit: mm):



Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918

Date	Revision	Notes
08/31/2021	01	Initial Release

Announcement

Information in this document is believed to be accurate and reliable. However, GLOSIC does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to Make Changes

GLOSIC reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

The datasheet with “REV.” + “Arabic numerals” is based on engineering data for initial reference purpose only.

The released datasheet would be issued with “REV.” + “alphabet characters”.

Company Name: GLOSIC Semiconductor Co., Ltd
Address: Rm 2108-2109, Building 3 , No.1800 Huangxing Rd, Yangpu, Shanghai, China 200433
Phone: +86 021-58586018 +86 18121002918